CLAIMS

What is claimed is:

- 1 1. A method for fabricating a write head, the method comprising:
- 2 laying an endpoint on a magnetic flux guide, the endpoint being resistant to milling;
- laying a sacrificial edge taper on the flux guide, the sacrificial edge taper having layers of different materials that have different milling rates;
- milling the sacrificial edge taper such that the different materials mill at different rates to create a desired angle for a negative mold; and
- filling the negative mold with a magnetic material to form a final edge taper for guiding

 flux to a write pole near the edge taper.
- 1 2. The method of claim 1, further comprising:
- laying a P3 layer against the final edge taper, the P3 layer comprising a yoke joined to a
- 3 write pole tip at a flare point, the write pole tip having a tip end that abuts an air bearing surface
- 4 (ABS) of a disk, wherein a distance from the ABS to the flare point is the same as a combined
- 5 thickness of the yoke and the final edge taper.
- 1 3. The method of claim 1, wherein the milling is ion milling.
- 1 4. The method of claim 3, wherein the endpoint resists ion milling.
- 1 5. The method of claim 4, wherein the endpoint comprises a material from a group
- 2 including rhodium, ruthenium, nickel chromium and copper.
- 1 6. The method of claim 1, wherein the edge taper is a leading edge taper.
- 1 7. The method of claim 1, further comprising:

- 2 layering a trailing edge taper (TET) on a trailing endpoint layer, the trailing endpoint
- 3 adjacent the write pole; and
- 4 milling away the TET to create a taper point.
- 1 8. The method of claim 7, wherein the trailing endpoint layer comprises layers of different
- 2 materials that have different milling rates, thus producing a controlled tapered shape.
- 1 9. The method of claim 8, wherein the taper point is between 40° and 50°.
- 1 10. The method of claim 8, wherein the trailing endpoint layer comprises a material from a
- 2 group including rhodium, ruthenium, nickel chromium and copper.
- 1 11. A write head in a hard disk drive, the write head being suitable for perpendicular
- 2 recording, the write head comprising:
- a write pole abutting a yoke at a flare point;
- an edge taper adjacent the yoke, the edge taper tapering to the flare point, the edge taper
- 5 being capable of shaping a flux field, the edge taper being formed by milling away different
- 6 layers of a sacrificial edge taper to create a negative mold
- an endpoint adjacent the edge taper, the endpoint being transparent to the flux field;
- 8 a magnetic flux guide adjacent the endpoint, the flux guide being capable of guiding
- 9 magnetic flux to the edge taper; and
- a magnetic flux source adjacent the magnetic flux guide, wherein a flux is shaped by the
- edge taper that is far enough away from an air bearing surface (ABS) adjacent the write pole to
- 12 avoid remanence and adjacent track interference, while still providing adequate flux strength to
- 13 the write pole for perpendicular recording on a disk in a hard disk drive.
- 1 12. The write head of claim 11, wherein the negative mold has a taper point between 40° and
- 2 50°.

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13. The write head of claim 11, wherein the edge taper is a leading edge taper.

- 1 14. The write head of claim 11, wherein the endpoint comprises a material from a group
- 2 including rhodium, ruthenium, nickel chromium and copper.
- 1 15. The write head of claim 11, wherein the edge taper is a trailing edge taper (TET).
- 1 16. The write head of claim 15, wherein the endpoint is a trailing endpoint layer comprising a
- 2 material from a group including rhodium, ruthenium, nickel chromium and copper.
- 1 17. A hard disk drive having a write head suitable for perpendicular recording, the write head
- 2 comprising:

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- a write pole abutting a yoke at a flare point;
- an edge taper adjacent the yoke, the edge taper tapering to the flare point, the edge taper
- 5 being capable of shaping a flux field, the edge taper being formed by milling away different
- 6 layers of a sacrificial edge taper to create a negative mold;
- an endpoint adjacent the edge taper, the endpoint being transparent to the flux field;
- 8 a magnetic flux guide adjacent the endpoint, the flux guide being capable of guiding
- 9 magnetic flux to the edge taper; and
- a magnetic flux source adjacent the magnetic flux guide, wherein a flux is shaped by the
- edge taper that is far enough away from an air bearing surface (ABS) adjacent the write pole to
- 12 avoid remanence and adjacent track interference, while still providing adequate flux strength to
- the write pole for perpendicular recording on a disk in a hard disk drive.
- 1 18. The hard drive of claim 17, wherein the negative mold has a taper point between 40° and
- 2 50°.
- 1 19. The hard drive of claim 17, wherein the edge taper is a leading edge taper.
- 1 20. The hard drive of claim 17, wherein the endpoint comprises a material from a group
- 2 including rhodium, ruthenium, nickel chromium and copper.

- 1 21. The hard drive of claim 17, wherein the edge taper is a trailing edge taper.
- 1 22. The hard drive of claim 21, wherein the endpoint comprises a material from a group
- 2 including rhodium, ruthenium, nickel chromium and copper.
- 1 23. A method of fabricating a write pole, the method comprising:
- 2 incorporating trailing edge taper (TET) material and an endpoint layer into a P3 write
- 3 pole;

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- 4 ion milling the P3 write pole to define both the P3 write pole and a TET;
- 5 encapsulating the P3 write pole;
- 6 providing a planar surface on the P3 write pole using a chemical and mechanical
- 7 polishing (CMP) process;
- 8 tapering the P3 write pole and TET with a combination of resist and ion milling; and
- 9 terminating the ion milling when the endpoint layer is exposed during milling, whereby a
- tapered structure of the P3 write pole is achieved.